# KYAE Standards for Mathematics Level 5  (9.0 – 10.9)

## Low Adult Secondary Education

**GED** GED® Test Preparation

KYAE Low ASE (NRS Level 5) Standards for Mathematics concentrate on the mathematical reasoning and application skills assessed by the test of General Educational Development (GED®).  Success at this level requires a thorough understanding of the concepts presented in the previous levels of the KYAE Standards for Mathematics.  Because all of the standards in Level 5 relate directly to the GED® test, the **GED** symbol does not appear in the body of the document.  However, symbols for the KEC (Kentucky Employability Certificate) ⚷ and college readiness ⬚ appear next to concepts which may be encountered on these additional assessments.  *Where a symbol precedes a standard, the symbol applies to all the benchmarks for that standard.*

**Guiding Principle:**  Use Math to Solve Problems and Communicate

| Content Strand 1 of 10<br>Recognize and Compare Numbers |
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| The focus of instruction in the Level 5 **Recognize and Compare Numbers** strand is on developing number sense with an emphasis on integers and scientific notation. |

⬚ **Standard 5.1.1 The adult student will recognize and use equivalencies between fractions, decimals and percents in contextual situations.**

| | Benchmark | Applications | Instructor Notes |
| --- | --- | --- | --- |
| **a.** | Convert between any **fraction**, **decimal**, **percent** and **mixed number** to demonstrate that **fractions**, **decimals** and **percentages** are different ways of expressing the same thing | Recognizing that a deli order for 3/4 pound will read about 0.75 on a digital scale. | Fractions, decimals, and percents are three different representations of the same number. Some numbers also can be represented in scientific notation. |
| **b.** | Use appropriate equivalencies  to solve real-world problems | | |

| | **Standard 5.1.2 The adult student will use scientific notation in contextual situations.** | | |
|---|---|---|---|
| | **Benchmark** | **Applications** | **Notes** |
| **a.** | Use **scientific notation** to write very large and very small numbers | Expressing distances encountered in astronomy | A number written in scientific notation is the product of two factors — a decimal greater than or equal to 1 but less than 10, and a power of 10 (e.g., $3.1 \times 10^5 = 310,000$). |

The focus of instruction in the Level 5 **Rounding and Estimation** strand is on problem solving and mathematical reasoning through the application of estimations skills.

**Standard 5.2.1 The student will apply the concept of rounding and estimation to solve multi-step problems, confirming results with a calculator.**

|  | **Benchmark** | **Applications** | **Instructor Notes** |
|---|---|---|---|
| **a.** | Use, analyze and explain procedures for making estimates with **fractions**, **decimals**, **percents** and **square roots** | Mentally computing the amount of cash needed to take a family to the movies | It is helpful to use estimation to develop computational strategies. For example, $2\frac{7}{8} \cdot \frac{3}{4}$ is about $\frac{3}{4}$ of 3, so the answer is between 2 and 3. |
| **b.** | Use estimation regularly to predict results of a calculation, detect potential errors and check the reasonableness of the solution | Answering test questions | |

The focus of instruction in the Level 5 **Number Theory and Mathematical Symbols** strand is on developing an understanding of number systems, including rational numbers.  Integer exponents are introduced.

**Standard 5.3.1  The adult student will summarize and apply mathematical concepts and properties to solve problems.**

| | Benchmark | Applications | Instructor Notes |
|---|---|---|---|
| **a.** | Explain and apply basic concepts of **divisibility**, **least common multiple (LCM)** and **greatest common factor (GCF)** | Helping children with homework | Number theory is a part of mathematics in which characteristics of numbers and relationships between numbers are examined.<br><br>Divisibility rules are useful tools in identifying prime and composite numbers. |
| **b.** | Explain and apply **commutative**, **associative** and **distributive properties** with whole numbers, **decimals**, **integers** and **fractions** | | The least common multiple of two or more numbers is the smallest common multiple of the given numbers.<br><br>The greatest common factor of two or more numbers is the largest of the common factors that all of the numbers share. |
| **c.** | Explain and apply the properties of **integer exponents** | Using scientific notation | A positive exponent indicates the base is to be multiplied by itself that number of times.<br><br>A negative exponent indicates the base is to be divided by itself that number of times. |

**Standard 5.3.2  The adult student will demonstrate an understanding of number systems.**

|  | Benchmark | Applications | Notes |
|---|---|---|---|
| **a.** | Explain that to solve certain problems and **equations**, number systems need to be extended from whole numbers to the set of all **integers** (positive, negative and zero), from **integers** to **rational numbers** | Preparing for further study | The set of natural numbers is the set of counting numbers (1, 2, 3, …).

The set of whole numbers is the set of natural numbers and zero (0, 1, 2, 3, …).

The set of integers is the set of whole numbers and their opposites (-3, -2, -1, 0, 1, 2, 3, …).

Rational numbers is the set of numbers that can be written as a ratio or fraction. |
| **b.** | Define and give examples of whole numbers, **integers** and **rational numbers** | | |

**Standard 5.3.3  The adult student will identify and use mathematical symbols and words that represent the symbols.**

|  | Benchmark | Applications | Notes |
|---|---|---|---|
| **a.** | Demonstrate the ability to use the **parentheses (   )** and **absolute value \|   \|** as algebraic symbols | | |
| **b.** | Demonstrate the ability to use the symbols for **congruency** $\cong$ and **similarity** $\sim$ in geometry | | |

The focus of instruction in the Level 5 **Mathematical Operations** strand is on the application of the order of operations on rational numbers and expressions.  Use of the scientific calculator is also emphasized.

**Standard 5.4.1  The adult student will demonstrate the ability to add, subtract, multiply and divide rational numbers with and without a calculator.**

| | | Benchmark | Applications | Instructor Notes |
|---|---|---|---|---|
| **a.** | | Add, subtract, multiply and divide: <br> • **fractions** and **mixed numbers** <br> • **decimals** of any size | | |
| **b.** | | Apply concepts of **absolute value** to add, subtract, multiply and divide with **positive** and **negative integers** | Comparing change in the value of stocks | Concrete experiences in formulating rules for adding, subtracting, multiplying and dividing integers should be explored by examining patterns along a number line and using manipulatives or by using algeblocks. |
| **c.** | | Demonstrate scientific calculator skills, (e.g., changing the sign of a number, finding the **square root** of a number, changing a **fraction** or a **percentage** to a **decimal**, etc.) | Figuring the effect on mortgage payments of a change in interest rates. | |

| | **Standard 5.4.2** The adult student will demonstrate the ability to apply the order of operations to algebraic expressions. | | |
|---|---|---|---|
| | **Benchmark** | **Applications** | **Notes** |
| **a.** | Simplify **expressions** that contain **rational numbers** (whole numbers, **fractions**, **decimals** and **integers**) and positive **exponents** by using the **order of operations** in a demonstrated step-by-step approach | | An expression, like a phrase, has no equal sign.<br><br>Expressions are simplified by using the order of operations.<br><br>The order of operations defines the computation order to follow in simplifying an expression.<br><br>The order of operations is as follows:<br>1. complete all operations within grouping symbols. If there are grouping symbols within other grouping symbols, do the innermost operation first.<br>2. evaluate all exponential expressions.<br>3. multiply and/or divide in order from left to right.<br>4. add and/or subtract in order from left to right. |

| | **Standard 5.4.3  The adult student will use strategies to solve word problems.** | | |
|---|---|---|---|
| | **Benchmark** | **Applications** | **Notes** |
| **a.** | Select the appropriate operation(s) to solve real-world, multi-step problems involving **rational numbers**, **ratios** and **proportions** | | Practical real-world problems may include, but not be limited to, those related to economics, sports, science, social sciences, transportation and health. Some examples include problems involving the amount of a pay check per month, the discount price on a product, temperature, simple interest, sales tax and installment buying. |
| **b.** | Apply **magnitude** to solve problems | | |
| **c.** | Choose appropriate methods of computing, such as paper and pencil, mental math, estimation or a calculator to solve problems | Taking a test for employment purposes | |

## Content Strand 5 of 10
## Measurements

The focus of instruction in the Level 5 **Measurements** strand is on the ability to use metric and customary systems to solve problems of perimeter, area and volume for a variety of geometric shapes.

**Standard 5.5.1  The adult student will select and use appropriate instruments, technology and techniques to solve problems of metric and customary measurement systems.**

| | Benchmark | Applications | Instructor Notes |
|---|---|---|---|
| a. | Convert within the **customary system of measures** any units of length, weight, **volume**, time and temperature to solve real-world problems | Changing ounces to cups when needed for recipes | |
| b. | Convert within the **metric system of measures** from one prefix to another to solve real-world problems | Determining the weight of a case of canned goods, change grams to kilograms | |

| | **Standard 5.5.2  The adult student will calculate measurements on a variety of geometric figures using the appropriate tools and formulas.** |
|---|---|

| | Benchmark | Applications | Notes |
|---|---|---|---|
| **a.** | Use measuring tools and other devices such as rulers, **protractors**, scales, meters and gauges to collect **data** | Checking the air pressure in a tire | |
| **b.** | Identify and apply the properties of **circles** to solve problems of **area** and **circumference** | Determining what size circular rug to buy | The area of a circle is computed by squaring the radius and multiplying that product by $\pi$ ($A = \pi r^2$, where $\pi = 3.14$ or $\frac{22}{7}$ ). |
| **c.** | Determine the **area** of a **polygon** with four or more sides by decomposing it into **triangles** | Ordering flooring for an irregularly shaped room | The area of any polygon is based upon knowing how to find the area of a rectangle.<br>The area of a parallelogram is computed by multiplying the measure of its base by the measure of its height.<br>The area of a trapezoid is computed by taking the average of the measures of the two bases and multiplying this average by the height.<br>An estimate of the area of a polygon can be made by subdividing the polygon into rectangles and right triangles, estimating their areas, and adding the areas together. |
| **d.** | Solve real-world, multi-step problems of **volume** involving **rectangular solids** and **cylinders** | Determining the amount of dirt needed for a raised flower bed | The volume of a cylinder is computed by multiplying the area of the base, $B$, ($\pi r^2$) by the height of the cylinder ($V = \pi r^2 h = Bh$). |
| **e.** | Solve real-world, multi-step problems of **area** involving **inscribed figures** (e.g., a **circle** inscribed in a **square**) | Deciding how much gravel for walkways and soil for beds in a large garden area | |

The focus of instruction in the Level 5 **Geometry** strand is on angle relationships, triangles, and the Pythagorean Theorem.

**Standard 5.6.1  The adult student will apply a variety of strategies and formulas for two- and three-dimensional shapes to solve real-world mathematical problems.**

| | **Benchmark** | **Applications** | **Instructor Notes** |
|---|---|---|---|
| **a.** | Identify and apply properties of **parallel** and **perpendicular lines** to solve problems | Explaining the route to a specific location | **a.** Parallel lines have the same slope. |
| **b.** | Identify and apply the properties of **angles** formed by:<br><br>• two **intersecting** lines<br> – pairs of **angles** that are **vertical**<br> – pairs of **angles** that are **complementary**<br> – pairs of **angles** that are **supplementary**<br><br>• a **transversal** crossing **parallel** lines<br> – **corresponding angles**<br> – **alternate exterior angles**<br> – **alternate interior angles** | Determining a specific angle of slope in construction | **b.** Parallel lines cut by a transversal form angles with specific relationships.<br><br>Some angle relationships can be used to prove that two lines cut by a transversal are parallel.<br><br>Vertical angles are the opposite angles formed by two intersecting lines. Vertical angles are congruent.<br><br>Complementary angles are any two angles such that the sum of their measures is 90°.<br><br>Supplementary angles are any two angles such that the sum of their measures is 180°. |

| | | | |
|---|---|---|---|
| | | | **e.** A quadrilateral is a polygon with four sides. Quadrilaterals can be classified by the number of parallel sides:<br>➢ a parallelogram, rectangle, rhombus, and square each have two pairs of parallel sides<br>➢ a trapezoid has only one pair of parallel sides<br>➢ other quadrilaterals have no parallel sides. |
| **c.** | Identify and apply the properties of **adjacent** and **right angles** to solve problems | | |
| **d.** | Identify and apply the properties of **acute**, **right**, **obtuse**, **equilateral**, **scalene** or **isosceles triangles** to solve problems | Drawing plans for a house | A parallelogram is a quadrilateral in which both pairs of opposite sides are parallel.<br>A rectangle is a parallelogram with four right angles. Since a rectangle is a parallelogram, a rectangle has the same properties as those of a parallelogram. |
| **e.** | Identify and distinguish between types of **quadrilaterals,** including **parallelogram, rectangle, square, rhombus** and **trapezoid** | Describe the shape of a piece of furniture, such as a coffee table. | A square is a rectangle with four congruent sides. Since a square is a rectangle, a square has all the properties of a rectangle and of a parallelogram.<br><br>A rhombus is a parallelogram with four congruent sides. Opposite angles of a rhombus are congruent. Since a rhombus is a parallelogram, the rhombus has all the properties of a parallelogram.<br><br>A trapezoid is a quadrilateral with exactly one pair of parallel sides. The parallel sides are called *bases,* and the non-parallel sides are called *legs.* If the legs have the same length, then the trapezoid is an isosceles trapezoid. |

**Standard 5.6.2  The adult student will apply the concepts of regularity, symmetry, congruence and similarity to geometric shapes.**

| | Benchmark | Applications | Notes |
|---|---|---|---|
| **a.** | Draw, identify and analyze **two-** and **three-dimensional** shapes, describing them in terms of **regularity**, **symmetry**, **congruence** and **similarity** | Describing a structure | Techniques for investigating symmetry may include paper folding.<br><br>Congruence and similarity have real-life applications in a variety of areas, including art, architecture, and the sciences.  Congruent figures are also similar, but similar figures are not necessarily congruent.<br><br>Similar geometric figures have the same shape but may have different sizes.  Two polygons are similar if corresponding (matching) angles are congruent and the lengths of corresponding sides are proportional.<br><br>A constant ratio exists between corresponding lengths of sides of similar figures.<br>Ratios and proportions can be used to determine the length of something that cannot be measured directly. Congruent polygons are similar polygons for which the ratio of the corresponding sides is 1:1. |

| | **Benchmark** | **Applications** | **Notes** |
|---|---|---|---|

**Standard 5.6.3  The adult student will use properties of triangles, right triangles and Pythagorean Theorem to solve problems.**

| | **Benchmark** | **Applications** | **Notes** |
|---|---|---|---|
| **a.** | Explain that the sum of the **angles** in a **triangle** equals 180 degrees | Creating designs for tapestry weavings | |
| **b.** | Apply proportional reasoning to find **corresponding sides** | Assembling a bookcase using directions | |
| **c.** | Identify the parts of a **right triangle** (the **hypotenuse** and the legs) | | In a right triangle, the square of the length of the hypotenuse equals the sum of the squares of the legs (altitude and base). This relationship is known as the Pythagorean Theorem: $a^2 + b^2 = c^2$. |
| **d.** | Apply the **Pythagorean relationship** to find the measure of a side of a **right triangle**, given the measures of the other two sides | Designing a baseball diamond | The Pythagorean Theorem is used to find the measure of any one of the three sides of a right triangle if the measures of the other two sides are known. |
| **e.** | Recognize situations where properties of **right triangles** and the **Pythagorean Theorem** apply | Determining the length of a pole needed to set up a tent | Whole number triples that are the measures of the sides of right triangles, such as (3,4,5), (6,8,10), (9,12,15), and (5,12,13), are commonly known as Pythagorean triples. |

The focus of instruction in the Level 5 **Using Ratios, Proportions and Percents** strand is on the application of percentage and proportional reasoning skills to solve a variety of multi-step real-world problems.

**Standard 5.7.1  The adult student will identify, calculate and apply ratios, proportions, rates and percentages to solve practical problems.**

|  | Benchmark | Applications | Instructor Notes |
|---|---|---|---|
| **a.** | Calculate the **percentage of increase** and **decrease** to solve word problems | Determining the amount for a raise for employees | Tips, discounts, sales tax, and simple interest are examples of practical problems involving percentages.   A discount is a percentage of the original price. The sale price is the original price minus the discount. |
| **b.** | Write **proportions** to express the relationships between **corresponding** parts of **triangles** and **quadrilaterals** to determine **similarity** |  | Proportional situations are based on multiplicative relationships. Equal ratios result from multiplication or division, not from addition or subtraction |

The focus of instruction in the Level 5 **Data Interpretation** strand is on the relationship of data interpretation to measures of central tendency. Scatter plots are introduced.

**Standard 5.8.1  The adult student will analyze, interpret and draw implications from the real-world data found in charts, graphs and tables from newspapers and/or online articles.**

|  | **Benchmark** | **Applications** | **Instructor Notes** |
|---|---|---|---|
| **a.** | Interpret **diagrams** and maps in real-life and workplace situations | Implementing evacuation procedures | |
| **b.** | Explain and critique alternative ways of presenting and using information | Comparing accident-related data to make a point concerning safety | |

**Standard 5.8.2  The adult student will collect, interpret, organize and display data in tables, charts and graphs, describing any patterns and relationships in the data.**

|  | Benchmark | Applications | Notes |
|---|---|---|---|
| a. | Collect responses to questions and organize them by categories such as shape, size, country, ethnicity, income level or yes/no responses | Conducting research for travel or relocation purposes | Methods of collecting and analyzing data are factors in determining the validity of any inferences or arguments based on the data. |
| b. | Organize and display **data** using appropriate methods to detect **patterns** and departures from **patterns** | Representing findings of data gathered from a yearly expense account | |
| c. | Interpret **scatter plots**, analyze **patterns** and describe relationships in **paired data** | Judging the accuracy of weather predictions | A scatter plot or scattergram illustrates the relationship between two sets of data. A scatter plot consists of points. The coordinates of a point represent the measures of two attributes of the point. |
| d. | Convert between different representations, such as **tables**, **graphs**, verbal descriptions and **equations** | Preparing a presentation for college classes or work | |

**Standard 5.8.3  The adult student will apply measures of central tendency and spread, analyzing the effect of changes in data on these measures.**

| | | Benchmark | Applications | Notes |
|---|---|---|---|---|
| **a.** | | Demonstrate an understanding of the terms *minimum, maximum* and *spread* | Reading temperature charts | For any given problem situation involving a set of data, the analysis is likely to include examination of measures of central tendency and dispersion of this data. |
| **b.** | | Demonstrate an understanding of the effect of **spread** on **mean** and **median** (e.g., that the **minimum** or **maximum** value can greatly affect the **mean** but will not affect the **median)** | Determining a grade point average | |
| **c.** | | Demonstrate an understanding that **range** is the difference between the smallest and largest values in the **data set** | Discussing different retirement investment plans with a financial planner | |

| | **Standard 5.8.4  The adult student will apply probability concepts and calculate simple probabilities.** | | |
|---|---|---|---|
| | **Benchmark** | **Applications** | **Notes** |
| **a.** | Apply the concepts of **dependent probability** and **independent events** to determine the **probability** that an event occurs | If two marbles are drawn randomly one after the other without replacement from a bag containing 4 red and 6 blue marbles, the **probability** that both marbles drawn are red is 4/10 · 3/9 = 2/15 because the **probability** of drawing a red marble on the second draw depends, or is conditional upon, the color of the first marble drawn) | Knowledge of probability can be used to determine the likelihood of winning such events as a prize through a raffle or lottery ticket, earning a high score in a dart game, or winning a card game.<br><br>Choices that involve chance are based on an understanding of the reasonableness of obtaining a specific outcome.<br><br>The probability that an event is likely to occur is close to one.<br><br>The probability that an event is not likely to occur is close to zero.<br><br>The probability that an event is as likely to occur as it is not to occur is close to one-half. |

The focus of instruction in the Level 5 **Number Line and Grids** strand is on developing the ability to graph linear equations.  Absolute value is introduced.

**Standard 5.9.1  The adult student will recognize and apply magnitude (absolute value) to rational numbers using a number line.**

| | Benchmark | Applications | Instructor Notes |
|---|---|---|---|
| **a.** | Locate both positive and negative fractional and decimal units on a **number line** | Recording very precise measurements | |
| **b.** | Explain the concept of **magnitude** using a **number line** | Evaluating statistical information | The distance of a number from the origin is its absolute value and the distance between two numbers on the number line is the absolute value of their distance (e.g., find the distance between -7.5 and 12.2) |

**Standard 5.9.2  The adult student will demonstrate the ability to graph linear equations in two variables on a coordinate grid, using a table of ordered pairs.**

| | Benchmark | Applications | Notes |
|---|---|---|---|
| a. | Construct a **table** of **ordered pairs** by substituting values for *x* in a **linear equation** to find values for *y* | | A linear equation is an equation in two variables whose graph is a line. Graphing a linear equation requires determining a table of ordered pairs by substituting into the equation values for one variable and solving for the other variable, plotting the ordered pairs in the coordinate plane, and connecting the points to form a straight line. |
| b. | Plot on a **coordinate grid ordered pairs** (*x, y*) from a **table** and connect the plotted **points** to form a straight line | | The equation of a line defines the relationship between two variables. The graph of a line represents the set of points that satisfies the equation of a line.  A line can be represented by its graph or by an equation. |
| c. | Determine whether a given **point** lies on a particular **line** | | The equation of a line can be determined by two points on the line or by the slope and a point on the line. |
| d. | Determine the **slope** of a line, identifying **slopes** as **positive** or **negative**, **zero** or **undefined** | Interpreting trend data | The slope of a line determines its relative steepness.  Changes in slope affect the graph of a line.  The slope of a linear function represents a constant rate of change in the dependent variable when the independent variable changes by a fixed amount. |
| e. | Determine the **x and y-intercepts** of a **line** | Preparing graphic depictions of data | |

**Standard 5.9.3  The adult student will demonstrate the ability to use coordinates to draw and describe geometric figures and transformations of geometric figures.**

| | Benchmark | Applications | Notes |
|---|---|---|---|
| **a.** | Draw the **reflection** of a figure over a **vertical** or **horizontal** line on a **coordinate grid** | Using CAD/CAM software to design a product | Geometric figures can be represented in the coordinate plane.<br><br>Transformations and combinations of transformations can be used to describe movement of objects in a plane. |
| **b.** | Draw 90°, 180°, 270° and 360° **rotations** of a figure on a **coordinate grid** | | |
| **c.** | Draw the **translation** of a figure on a **coordinate grid** | | |
| **d.** | Compare and contrast **translations**, **reflections** and **rotations** | | |

The focus of instruction in the Level 5 **Algebra** strand is on developing the ability to apply algebraic concepts to solve problems involving multi-step equations and inequalities.

**Standard 5.10.1  The adult student will demonstrate the ability to describe and represent relations and functions, using tables, graphs and rules.**

|  |  | **Benchmark** | **Applications** | **Instructor Notes** |
|---|---|---|---|---|
| **a.** |  | Explain and demonstrate the difference between **relations** and **functions** |  | A relation is any set of ordered pairs. For each first member (domain), there may be many second members (range). |
| **b.** |  | Write a rule that represents a **relation** from a **table of values** |  | A function is a relation in which there is one and only one second member (range) for each first member (domain).

Some relations are functions; all functions are relations. |
| **c.** |  | Write a **table** of values from the **graph** of **ordered pairs** of a **relation** | Designing a savings plan for a new car | As a table of values, a function has a unique value assigned to the second variable (range) for each value of the first variable (domain). |

| | | **Standard 5.10.2  The student will apply basic algebraic concepts to simplify, evaluate and solve expressions, equations and inequalities.** | |
|---|---|---|---|

| | | Benchmark | Applications | Notes |
|---|---|---|---|---|
| **a.** | | Demonstrate the ability to **simplify algebraic expressions** by combining **like terms** | Preparing for further study | |
| **b.** | | Demonstrate the ability to apply the **distributive property** to **simplify algebraic expressions** with **parentheses** | | |
| **c.** | | Demonstrate the ability to apply **order of operations** (Parentheses, Exponents, Multiplication, Division, Addition, Subtraction: PEMDAS) to **evaluate expressions** with **variables**, including common **formulas** | Helping children with homework | |
| **d.** | | Demonstrate the ability to apply **inverse operations** to solve **equations** and **inequalities** | | In an equation, the equal sign indicates that the value on the left is the same as the value on the right.  To maintain equality, an operation that is performed on one side of an equation must be performed on the other side.

The same procedures that work for equations work for inequalities.  When both expressions of an inequality are multiplied or divided by a negative number, the inequality sign reverses. |
| **e.** | | Demonstrate the ability to **evaluate formulas** | | |
| **f.** | | Decide on the effectiveness of the **expression** by substituting known values | | |

**Standard 5.10.3** The adult student will demonstrate the ability to create and use algebraic expressions, equations and inequalities to model situations and solve problems.

| | Benchmark | Applications | Notes |
|---|---|---|---|
| **a.** | Write verbal phrases as **algebraic expressions** and sentences as **equations** or **inequalities** from word problems | Preparing for further study | An algebraic expression is a variable expression that contains at least one variable (e.g., $2x - 5$).<br><br>An equation is a mathematical sentence that states that two expressions are equal. |
| **b.** | Solve multi-step **equations** and **inequalities** in one **variable**, showing the steps | | An inequality is a mathematical sentence that states that one quantity is less than (or greater than) another quantity.<br><br>A two-step equation is defined as an equation that requires the use of two different operations to solve (e.g., $2x + 3 = -4$). |
| **c.** | Recognize and apply **formulas** to model situations | Determining the effects of inflation on a monthly budget | A two-step inequality is defined as an inequality that requires the use of two different operations to solve (e.g., $3x - 4 > 9$). |
| **d.** | Recognize and solve problems that can be modeled using a **linear equation** in one **variable**, such as time/rate/distance problems, **percentage increase** or **decrease** problems, and **ratio** and **proportion** problems | Figuring the effects of an adjustable mortgage rate<br><br>If 8 pens cost $10, how much will 20 pens cost? | A formula is a statement based on logical mathematical conclusions or observation and experimental evidence (e.g., the volume of a circular cylinder, $V = \pi r^2 h$). |